

PATENT ABSTRACTS OF JAPAN

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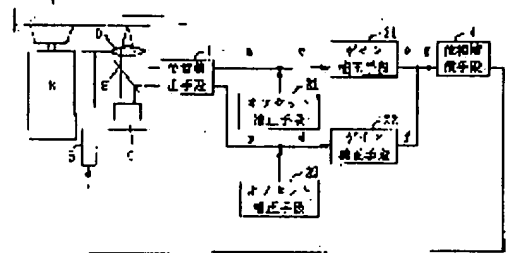
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(54) FOCAL POSITION CONTROLLER

(57)Abstract:

PURPOSE: To provide the controller capable of facilitating and automatically executing the adjustment of a focal position signal.

CONSTITUTION: This controller is provided with a position detecting means 1 with receives a reflected light beam that is reflected at a reflection surface and outputs two signals that vary in accordance with the distance between the focus position of the light beam and the reflection surface, a means which obtains a difference signal between these two signals and a signal adjustment means. As an adjustment means, the device is provided with offset compensating means 31 and 32 which individually compensate for offsets to the two signals outputted by the means 1 and gain compensating means 21 and 22 which individually compensate for gains to the two signals in which offsets are compensated for. Since the signals, which enter into the means 21 and 22, are beforehand compensated to an offset zero condition by the means 31 and 32, there is no effect on the offsets and an adjustment, which only requires a gain change, is provided.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] About the focal positional controller for controlling condensing of the light beam used for an optical record regenerative apparatus etc., this invention is constituted so that a focal control location can be adjusted especially easily.

[0002]

[Description of the Prior Art] As shown in drawing 5, an optical record regenerative apparatus rotates the disc-like record medium A by the spindle motor B, irradiates the light beam emitted from the light source C on the concentric circular or spiral track of a record medium A through objective lens D, and is performing informational record and playback. This light beam is equipped with the focal positional controller which controls automatically the distance of objective lens D and a record medium A so that the focus may always be connected to the front face of a record medium A, therefore a light beam may condense correctly on a record medium A in an optical record regenerative apparatus.

[0003] A location detection means 1 to receive the light beam in which the conventional focal positional controller was reflected on the front face of a record medium A through objective lens D and the half mirror E, A gain amendment means 2 to amend gain to one side of two signals which the location detection means 1 outputs, It has an offset amendment means 3 to amend offset to the difference signal of one signal after gain amendment, and the signal of another side, and a phase compensation means 4 to send out the signal which controls the distance of objective lens D and a record medium A to the objective lens driving means 5 based on said received difference signal.

[0004] When two photosensors (or four pieces) arranged to the symmetry are provided and the focus of a light beam is in the back rather than the front face of a record medium, the output of one photosensor shows the maximum, and when it is in reverse rather than the front face of a record medium in this side, the location detection means 1 is constituted as the output of the photosensor of another side shows the maximum, as known well.

[0005] Each output of these photosensors is outputted as two signals of the location detection means 1, and it is adjusted so that the characteristic curve which the difference signal of those signals shows to e of drawing 6 may be drawn through amendment of gain and offset. The axis of abscissa expresses the distance of a record medium A and objective lens D on this drawing, and the intersection of the curve of a difference signal and the line of an output 0 shows the location of objective lens D when a light beam connects a focus to a record-medium A front face.

[0006] After these adjustments are completed, the automatic control of a focal location becomes possible. A location detection means 1 detects the light beam reflected on the front face of the rotating record medium A, and the difference signal of two signals outputted from the location detection means 1 moves delivery and objective lens D from a phase-compensation means 4 to an objective lens driving means 5 for the signal with which that "gap" compensates, and makes the focus of a light beam in agreement with the front face of Storage A in this control at the condition of an output 0 to the time of "gap" *****.

[0007] Adjustment of a difference signal is performed as follows.

[0008] Change of the signal output in each point (a, b, c, d, e) of a focal positional controller when the location of objective lens D moves is shown in drawing 6: In order to balance two signals (a and b of drawing 6) which the location detection means 1 outputs, the gain amendment means 2 amends the gain of one signal (c of drawing 6). If the differential of two signals made to balance is taken, the difference signal has offset (offset)

between the lines of an output 0, as shown in d of drawing 6 . The offset amendment means 3 amends this and the center line of a difference signal is set by 0 (e of drawing 6). If it will be in this condition, it will become possible to detect an information signal from the rotating record medium A, controlling a focus in a fixed location.

[0009] Then, moving a focal control location by changing gain balance as fine adjustment of a control-objectives location, the reinforcement of the information signal acquired from the rotating record medium A is measured, and gain balance is set as the condition that reinforcement serves as max.

[0010] Thus, a focal control-objectives location is adjusted correctly.

[0011]

[Problem(s) to be Solved by the Invention] However, in the conventional focal positional controller, when the gain of one signal is adjusted and gain balance is changed, change cannot be caused to offset of a difference signal, either and it cannot adjust only gain balance independently.

[0012] Therefore, on the occasion of fine adjustment of control objectives, the actuation which gain balance is changed and is adjusted, and actuation in which an amendment means adjusted the offset produced since gain was changed needed to be repeated by turns, and adjustment took long duration, and an experience and technique of a coordinator were needed.

[0013] Moreover, in the conventional focal positional controller, in this way, since decision of a repeat and long adjustment time amount are needed in adjustment, when automating adjustment, there is a fault to which equipment becomes complicated too much, therefore automation of adjustment is not performed.

[0014] This invention aims at offering the focal positional controller which can improve these faults that conventional equipment has, and can adjust a focal position signal easily, and can perform this adjustment automatically.

[0015]

[Means for Solving the Problem] Then, a location detection means to output two signals which receive the light beam reflected in the reflector in this invention, and are changed according to the distance of the focal location of a light beam, and a reflector, In the focal positional controller equipped with a means to search for the difference signal of these two signals, and the adjustment device of a signal An offset amendment means to amend offset according to an individual as an adjustment device to two signals which a location detection means outputs, and a gain amendment means to amend gain according to an individual at least to one side of two signals with which offset was amended are established.

[0016] Moreover, a detection means to detect the reflectivity of a light beam reflected in the reflector, and a gain balance setting-out means to set the amount of amendments of a gain amendment means as the condition that receive a detection result from a detection means and reflectivity serves as max are established.

[0017] Furthermore, it constitutes so that the light beam in which the location detection means was reflected by the signal recording surface of the record medium in an optical record regenerative apparatus may be received.

[0018] Moreover, the gain balance setting-out means has set up the amount of gain amendments of a gain amendment means so that the signal strength of the information signal reproduced from the signal recording surface of a record medium may become max.

[0019]

[Function] Therefore, in the focal positional controller of this invention, since an offset amendment means can amend beforehand the signal inputted into a gain amendment means in the condition of offset 0, the adjustment which changes only gain balance is attained, without affecting offset.

[0020] Moreover, a focal control-objectives location can be finely tuned by setting gain balance as the condition that reflectivity serves as max, detecting reflectivity.

[0021]

[Example]

(The 1st example) As the focal positional controller of the 1st example of this invention is shown in drawing 1 , it has offset amendment means 31 and 32 amend offset to each of two signals which the location detection means 1 outputs, and gain amendment means 21 and 22 amend gain, and the difference signal of two signals is formed by taking the differential of the signal after amending gain and offset. Other configurations do not have conventional equipment (drawing 5) and a change.

[0022] In this focal positional controller, adjustment of a difference signal is performed as follows.

[0023] Change of the signal output in each point (a, b, c, d, e, f, g) of the focal positional controller at the time

of moving the location of objective lens D is shown in drawing 3 . Amendment which sets offset to 0 with the offset amendment means 31 and 32 is performed to each of two signals (a and b of drawing 3) which the location detection means 1 outputs, and the property shown in c and d of drawing 3 is acquired. Amendment for taking gain balance with the gain amendment means 21 is performed to one of the two of two signals which amended offset. Consequently, two signals serve as a property shown in e and f of drawing 3 . The difference signal shown in g of drawing 3 is formed by taking the differential of these two signals.

[0024] In fine adjustment of a control-objectives location, measuring the reinforcement of the information signal detected from the rotating record medium A, after adjusting a difference signal to the condition of g of drawing 3 ; gain balance is changed with the gain amendment means 21 and 22, a focal control location is moved, and gain balance is set as the condition that the reinforcement of an information signal serves as max.

[0025] In this case, fluctuation of offset is not produced even if it changes gain, since the signal inputted into the gain amendment means 21 and 22 is already adjusted to 0 in offset.

[0026] Thus, in the focal positional controller of the 1st example, it is possible to change gain balance, without affecting offset, therefore fine adjustment to a control-objectives location can be performed easily.

[0027] In addition, the gain amendment means 21 and 22 may omit either.

[0028] (The 2nd example) The focal positional controller of the 2nd example of this invention It constitutes so that a control-objectives location can be tuned finely automatically. This equipment As shown in drawing 2 , in the configuration of the focal positional controller of the 1st example In addition, a gain balance setting-out means 6 to set up the amount of amendments of the offset amendment means 31 and 32 and the gain amendment means 21 and 22, It has an information signal on-the-strength detection means 7 to transmit the signal about the reinforcement of an information signal to this gain balance setting-out means 6.

[0029] Adjustment of a difference signal is performed in the following order:

[0030] To the location detection means 1, the light beam reflected with the record medium A maintains the condition of not carrying out incidence, measures the output of two signals of the location detection means 1 at this time, inputs into the gain balance setting-out means 6 by making this measured value into the amount of offset amendments, and sets up the amount of offset amendments of the offset amendment means 31 and 32.

[0031] Subsequently, it returns to the condition that the location detection means 1 can receive the light beam reflected from the record medium A, and in the gain balance setting-out means 6, the amount of gain amendments of the gain amendment means 21 and 22 is set up so that the maximum amplitude of two signals outputted from the location detection means 1 may be in agreement.

[0032] And in order to tune a control-objectives location finely, the gain balance setting-out means 6 changes the amount of gain amendments of the gain amendment means 21 and 22, and the information signal on-the-strength detection means 7 detects the information signal reinforcement at that time. In this case, according to change of the amount of gain balance amendments, information signal reinforcement draws the curve shown in drawing 4 , and is changed. With the gain balance setting-out means 6, the detecting signal of the information signal detection means 7 is received, and the amount of gain amendments of the gain amendment means 21 and 22 is set as the condition that information signal reinforcement serves as max.

[0033] Thus, in the focal positional controller of the 2nd example, automation of adjustment of the amount of gain balance amendments is in drawing by performing automatically each actuation of changing the amount of gain amendments, detecting the information signal amplitude while this moves a focal control location, finding the control location where the information signal amplitude serves as max, and setting up the amount of gain amendments.

[0034] In addition, it not only uses the focal positional controller of this invention for an optical record regenerative apparatus, but it can use it as a focal positional controller of the other device.

[0035]

[Effect of the Invention] In the focal positional controller of this invention, a focal control location can be easily adjusted so that clearly from explanation of the above example.

[0036] Moreover, in connection with this adjustment having become easy, regulating [of the amount of gain balance amendments] automatically is possible.

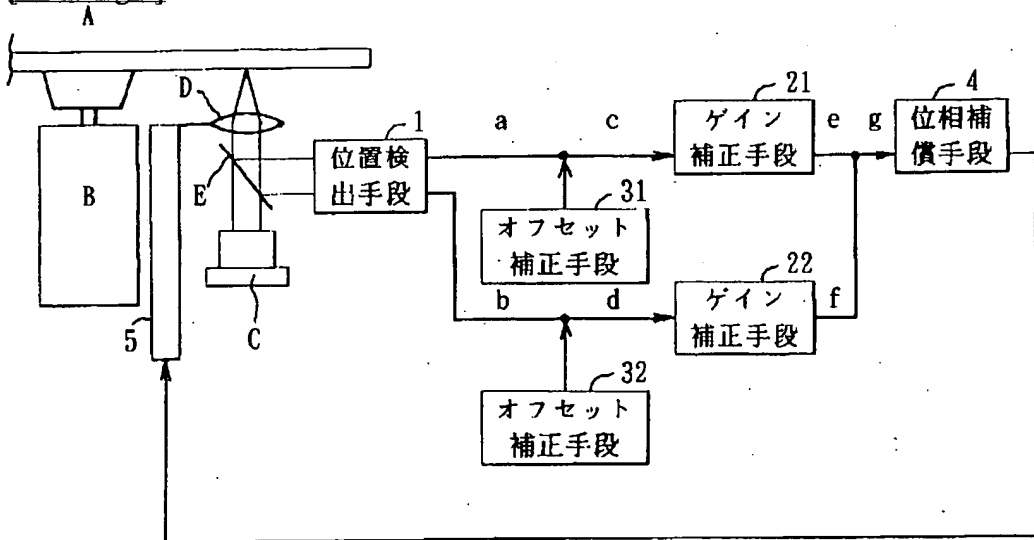
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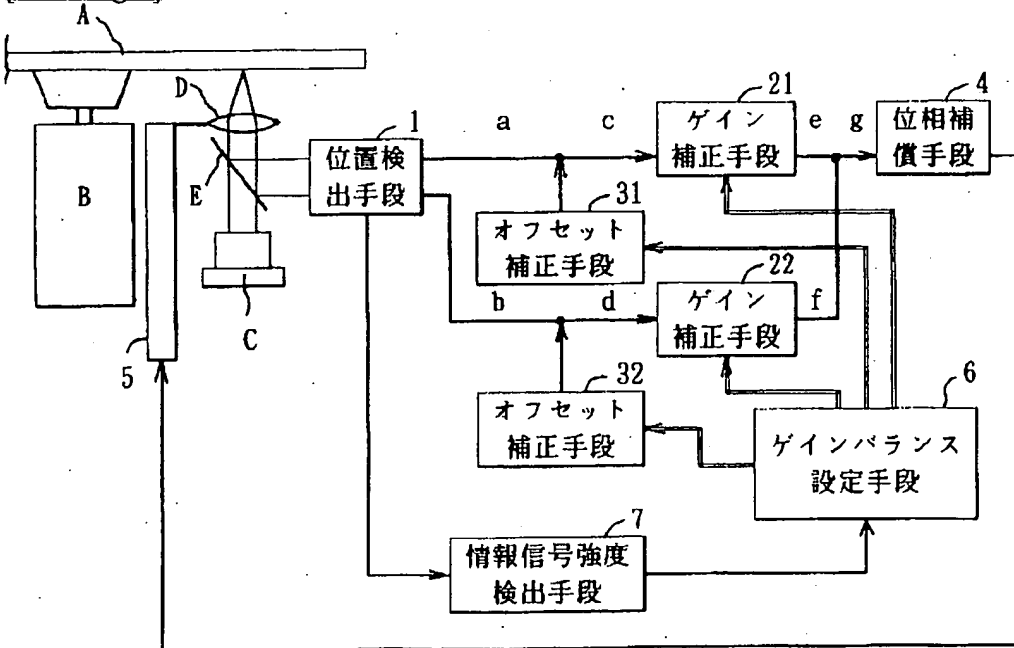
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DRAWINGS

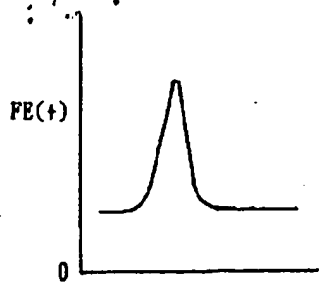
[Drawing 1]



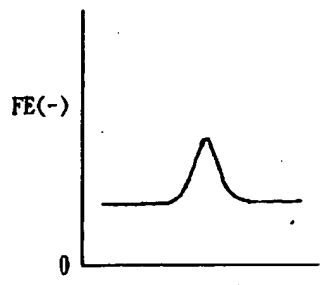
[Drawing 2]



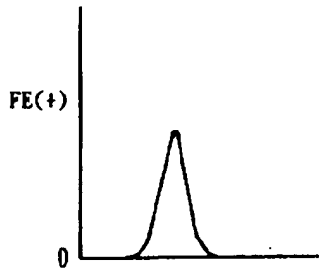
[Drawing 3]



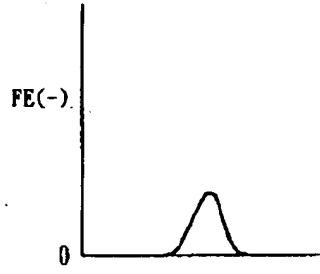
レンズ位置
(a)



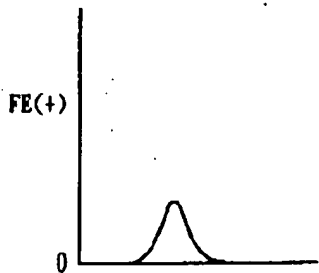
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(b)



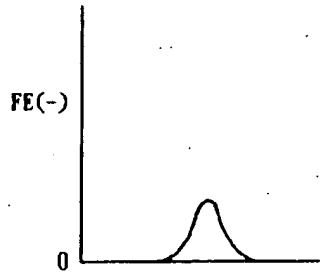
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(c)



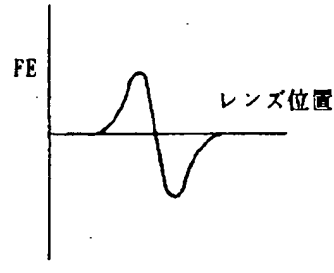
レンズ位置
(d)



レンズ位置
(e)

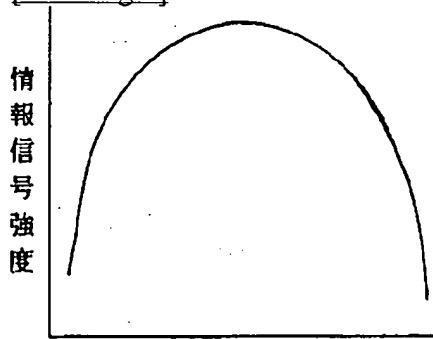


レンズ位置
(f)



(g)

[Drawing 4]



ゲイン・バランス補正量

[Drawing 5]

